



An Examination of β -glucanase

β -glucanase was first used in barley-based rations in Europe. Barley contains a large amount of soluble NSPs in the form of β -glucans and arabinoxylans. These β -glucans result in poor nutrient absorption through large increases in gut viscosity. Thus, as early as the 1980s, β -glucanase enzymes began to be supplemented in barley-based rations to alleviate some of these detrimental effects.

Based on the β -glucan content of corn and soybean meal (see below), it would appear that there was little potential for improvement through β -glucanase supplementation in corn and soy-based poultry rations. However, this is somewhat misleading, as some β -glucanases function as cellulases.

NSP breakdown in elementary sugars (% DM)

	<i>Carbohydrates</i>	Corn	Barley	Wheat	Rye
Total NSPs		9.9	18.7	11.9	15.3
β-glucans		0.1	4.2	0.8	1.6
Cellulose		2.2	4.3	2.0	1.6
	Mannose	0.3	0.4	0.3	0.5

	<i>Carbohydrates</i>	Soybean meal	Rapeseed meal	Sunflower meal
Total NSPs		21.9	22.2	31.5
β-glucans		-	-	-
Cellulose		6.2	5.2	12.3

Bach-Knudsen, Knud Erik, 1997. Carbohydrate and lignin content of plant materials used in animal feeding. Anim. Feed Sci. Tech. 67: 319 - 338.

▶ An Examination of β -glucanase (cont'd)

Cellulose, one of the primary components of plant cell walls, represents a large portion of the NSP content of most cereal grains and oilseeds (see above). For instance, cellulose represents approximately 28% of the total NSP present in soybean meal and approximately 22% of the NSP present in corn. Cellulose consists of long chains of D-glucose subunits, linked by β -1, 4 linkages. For these β -1, 4 linkages to be separated, the activity of endo-1, 4- β -glucanase is required. As poultry do not produce this enzyme endogenously, it must be supplied in the ration.

It should be pointed out that it is very unlikely that cellulose can be degraded to its glucose subunits by an NSP-degrading enzyme given the short transit time in the digestive tract of poultry. Rather, potential for improvements in digestibility exists through the ability of endo-1, 4- β -glucanase to elicit structural changes in the cell walls of grains and oilseeds, which could allow the bird's endogenous enzymes better access to nutrients.